ESA-036-2 Schreiber Foods, Inc. - Mt. Vernon Plant
FINAL PUBLIC REPORT

Introduction
Headquartered in Green Bay, Wis., Schreiber is a privately held dairy company with sales in excess of $3 billion. Its products – which include process, natural, cream and specialty cheese and yogurt – are sold primarily through customer brand distribution programs.

The ESA occurred at the Mt. Vernon, MO plant. This facility produces dairy products.

The overall site steam system at the Mt. Vernon, MO plant was the focus of a 3-day steam system Energy Savings Assessment (ESA).

Objective of ESA
The main objectives of the ESA were as follows:

- Understand and identify steam system energy savings opportunities for the Mt. Vernon, MO plant.
- Demonstrate and use the DOE Steam tools such as the Steam System Scoping Tool (SSST), Steam System Assessment Tool (SSAT) and the 3E Plus insulation software to model the steam system at the plant.
- Assist the plant maintenance team to familiarize and have the ability to use all of the above mentioned tools to identify energy efficiency improvement opportunities at the plant and quantify the potential energy savings associated with the steam system.

Focus of Assessment:
Overall plant-wide steam system

Approach for ESA:
Plant personnel from the Maintenance Department formed the Core Team in this Steam ESA. This core team supports all the maintenance of plant utility equipment and they will be able to use SSST, SSAT and 3EPlus, on an as needed basis, to evaluate ongoing and future projects. Relevant results will be shared by the core team with production and operations at all plants.

The ESA core team first completed the Steam System Scoping Tool (SSST) on the steam system. A detailed plant walk-through covering all the areas of the plant was completed.

Detailed combustion analysis of the stack for each of the boilers was done during the ESA. Additionally, all the steam-piping was followed until each individual end-use and temperatures were measured using an infra-red temperature gun. Information was captured from production and operations personnel on an as needed basis. The SSAT and 3EPlus software tools were used to identify energy and cost saving opportunities. A 2-pressure header SSAT steam system model was used to study the impact of potential improvement opportunities at the plant.

General Observations of Potential Opportunities

The DOE Steam ESA was an effort on the part of the plant to identify any potential energy savings opportunities and quantify them to assist the plant in increasing their energy efficiency. Based on the Steam ESA, steam savings opportunities exist in different areas. These opportunities are described in the sections below:

1. Improve Boiler Efficiency - Implement Automatic Oxygen Trim Controller (Near term)
The boiler currently has a positioning controller and does undergo a boiler tune-up. Current stack gas analysis showed that the boiler was operating at an average of 11.5-12% flue gas oxygen levels. This results in very lean combustion and stack loss. It is recommended to implement an automatic oxygen trim controller that will maintain tight controls on the excess air and result in an increase in boiler efficiency.

2. Implement Feed water Heat Recovery (Medium term)
Implementing a feed water heat recovery exchanger also known as an economizer can reduce stack temperatures resulting in savings on the steam that is currently used to heat the incoming make-up water.

3. Install Blowdown Flash to Low-Pressure Steam (Near term)

There is an atmospheric blowdown flash tank that collects blowdown from the boiler. This tank continuously vents steam to the ambient whenever there is blowdown from the boiler. This flash steam can be captured and introduced into the atmospheric feed water heating tank. This would capture all the thermal energy that is currently lost to the ambient in the vented steam.

4. Add Feed water Heat Recovery Exchanger using Boiler Blowdown (Near term)

Even after a blowdown flash tank, the heated liquid (water) presents an opportunity for heat recovery from this boiler blowdown. Installing a feed water heat recovery exchanger using boiler blowdown would recover additional thermal energy.

5. Improve insulation (Near term)

There is good overall insulation in the plant but certain areas can be improved. It has to be noted that certain areas cannot be insulated because of the sanitation and wash down cycles. It is recommended that an insulation energy appraisal / audit should be performed as a next step and an economic insulation thickness be calculated for each individual entity. An infra-red thermography on boilers, steam distribution, equipment should also be periodically conducted to ensure the insulation integrity.

6. Other - Cover Open Heated Tanks & Vessels (Near term)

Installing lids or covers on COP tanks will reduce energy loss from convection and will reduce steam loss. Secondly, installing a steam sparger in all COP tanks will distribute steam along the length of the tank rather than a one spot introduction. This will reduce total steam needed by the COP tanks.

7. Other – Install Condensing Economizer (Long term)

With the availability of state-of-the-art metallurgical practices, condensing economizers are now being used in several industrial plants. They have found a niche application in the food processing industry because it has such a high demand for hot water. A condensing economizer recovers all the latent heat from the stack and if a direct contact economizer is used, it can provide hot water up to 140°F.

8. Other Opportunities & Best Practices

Monitor and trend utility usage and cost profile

Using the SSST tool for steam system profiling in the Mt. Vernon, MO plant. will get them closer to observed Best Practices in the field.

Monitor and trend major equipment efficiencies

There is enough instrumentation on all major equipment in the Mt. Vernon, MO plant to allow for a measure of efficiency. Monitoring and trending equipment efficiency and certain evaluated parameters can be an extremely important tool for fault detection and diagnostics of boilers, air compressors, heat exchangers, etc. It is recommended that the maintenance team use this data to monitor and trend equipment efficiency and conduct predictive maintenance on as needed basis.

Management Support and Comments

Plant management at Mt. Vernon provided full support to the ESA Team to capture any and every economically justifiable opportunity. The core team spent three days working with the ESA Specialist. Plant management support was clearly evident with the fact that the Plant Manager attended both the Kick-off and Wrap-up meetings and discussed opportunities that were identified in the ESA.

The definitions for Near, Medium and Long-term are as follows:

- Near term opportunities would include actions that could be taken as improvements in operating practices, maintenance of equipment or relatively low cost actions or equipment purchases.
- Medium term opportunities would require purchase of additional equipment and/or changes in the system such as addition of recuperative air preheaters and use of energy to substitute current practices of steam use etc. It would be necessary to carryout further engineering and return on investment analysis.
- Long term opportunities would require testing of new technology and confirmation of performance of these technologies under the plant operating conditions with economic justification to meet the corporate investment criteria.